

Herring River Subwatershed Harwich, Cape Cod, Massachusetts

The Herring River Subwatershed is located in Harwich and Brewster. It has an area of 9,135 acres. The Herring River is seven miles long and is well used by residents and visitors. Coy's Brook meanders through the watershed and is the Herring River's most important tributary. There are 23 ponds within the Herring River watershed, including the Cape's largest pond, Long Pond, which is over two miles in length.

Harwich currently has 5,000 acres of vacant developable land. If one half of that is protected, it would mean that 26 percent of the total available upland would be set aside in the town. Currently, just eight percent of available open space is preserved in Harwich. The larger protected areas include the Coy's Brook Woodlands (30 acres of forest and wetland preserved by the Harwich Conservation Trust) and Brewster's Punkhorn Parklands (800 acres with wooded trails that pass by lakes, ponds, and marshes).

The Herring River is experiencing problems with water quality and invasive aquatic plants. The Herring River drains more than a million gallons of freshwater to the sea on each ebb tide. A baseline study conducted of Herring River in 2000 found elevated concentrations of nutrients, chlorophyll, and depressed dissolved oxygen levels. Concentrations of dissolved nutrients were slightly higher in the upstream portions of the lower Herring River. The pH, temperature, and salinity were within normal ranges for an estuary. The high flushing rate that was determined for the area – the entire basin flushes approximately every two days – affords the water some measure of protection against environmental pollution. The state water quality standards for shellfishing waters and recreational waters were exceeded at various times during the summer. The Herring River experiences problems with invasive aquatic species, most notably duckweed, wild rice, and rice-cutgrass. Herring fish fry can become trapped in the duckweed mats, swim up onto the surface of the mats, and die of suffocation. According to Division of Marine Fisheries Sanitary Surveys, the Herring River is the most important shellfish area for town. This site recently reduced its seasonal opening.

Long Pond is the largest great pond on Cape Cod, covering over 740 acres. It is undergoing fish kills, algal blooms, reduced clarity, and loss of fish habitat because of low oxygen conditions in the bottom waters, brought on by the release of phosphorus from bottom sediments. The Long Pond Watershed Association formed in 1996 to work towards protecting and restoring the health of the pond. A 1999 study by the Cape Cod Commission concluded that the pond is experiencing low oxygen conditions during summer months due to bacterial respiration during the decomposition of organic materials. Limited oxygen is an impairment to the habitat of bullheads, trout, and other aquatic organisms that live in the colder bottom waters during the summer.

The greatest source of phosphorus that feeds recurring algae blooms in Long Pond is from the bottom sediment. The testing and analysis conducted by ENSR in 2000 as reported in their June 2001 document confirmed and expanded the previous findings in the 1999 study. The input sources of phosphorus were identified as regeneration from bottom sediments 64%, surface runoff 17%, groundwater in seepage (includes possible septic system sources) 9%, precipitation 8%, and waterfowl 1%. There are approximately 101 shoreline residences in Harwich, with approximately 209,000 square feet of cultivated lawn area, and 35 shoreline residences in Brewster, with approximately 5,000 square feet of lawn. On the Harwich side of the pond, there are 35 septic systems within 100 feet of the pond and another 26 within 200 feet. On the Brewster side there are 10 systems within 100 feet and 21 within the 200 foot zone.

The Wixon Dock on the Herring River, the beach on Aunt Edie's Pond, and Belmont Beach were closed for swimming during part of the summer in 2001 due to high levels of the bacteria

enterococcus. Under the 2001 Beaches Act, the safe limit for *E. coli* bacteria for ponds is 235 parts per million (ppm) and for saltwater beaches is 104 ppm. Levels were 400 at Wixon Dock, 236 at Aunt Edie's Pond, and 126 at Belmont Beach. These high counts appeared to be tied to high rainfall events.

This subwatershed hosts the Six Ponds District of Critical Planning Concern (DCPC), which was designated in 2000. The area is comprised of almost 1,300 acres of land and water, including Aunt Edie's, Black, Cornelius, Hawksnest, Oliver's, and Walker's Ponds. The town nominated the district to protect water resources, natural resources, wildlife habitat, and open space/recreational opportunities, as well as to develop growth management strategies. The town developed regulations for the area that included zoning changes to limit lot sizes and coverages, clearing and grading activities, buffer areas along scenic road corridors, pond buffer areas, and flexible cluster developments.

The Town of Harwich water system is supplied by twelve wells located in South, East, and North Harwich, which draw water from the Monomoy Lens aquifer. Approximately 90% of the town is supplied by public water. The need for additional water storage in Harwich led to the purchase of land for a water tower north of Aunt Edie's Pond in 2000, but plans to borrow \$3.1 million to build the tank have been put on hold.

Approximately 75% of Brewster has municipal water as does nearly all of Dennis. Some areas of Brewster that do not have public water are the subdivisions off of Slough Road in the southwest portion of the town, Crowell Bog Road between Route 124 and 137, and the middle section of Great Fields. The town plans to have water available to virtually all areas within the next five years.

There are no public sewers in Harwich, Brewster, or Dennis. As of Spring 2002, the Harwich Planning Board is beginning to hold informal discussions on how best to solve wastewater contamination of the town's harbors.

Stewards:

- Harwich Shellfish and Marine Water Quality Committee (www.vsv.cape.com/~harharb/main6.html)
- Long Pond Watershed Association
- Skinequit Pond Association
- Herring River Management Committee
- Brewster Pond Water Quality Stewards (formed May 2002)

Studies conducted in the watershed:

- Long Pond Water Quality Assessment/Impact Analysis: Final Report. March 1999. Cape Cod Commission, Water Resources Office.
- Daily fish kill counts on Long Pond from early June to mid July, tabulated by quantity, species, and size. Conducted from 1997 to present by the Long Pond Watershed Association.
- Coastal Nitrogen Loading Project: Interim Report. September 2000. Cape Cod Commission.
- Coastal Nitrogen Loading Project: Final Report. April 2002. Cape Cod Commission Water Resources Office. (1 of the 4 sites assessed was the Herring River).
- Management Study of Long Pond, Brewster and Harwich, Massachusetts. June 2001. Prepared by ENSR International for the Cape Cod Commission and the Towns of Brewster and Harwich, Mass.
- Diagnostic Study of Herring River, Harwich. Town of Harwich Planning Department. This document outlines recommendations to improve the health of ecosystems in and along the river.
- Herring River Anadromous Fish Project, proposed in 2000 by G. Tunnison.

- A Baseline Hydrodynamic and Water Quality Investigation of the Lower Herring River. 2000. Horsley & Witten, Inc. Study looked at presence of chlorophyll, nitrogen, phosphorus, dissolved oxygen, pH, temperature, and salinity.
- Source Water Assessment and Protection (SWAP) Report for Harwich water supplies. Nov. 2001. MA Department of Environmental Protection. Report identifies land uses within water supply protection areas that may be potential sources of contamination. Available from the DEP online at <http://www.state.ma.us/dep>
- Brewster Priority Open Space Project – 2001. Created a ranking list of undeveloped parcels that, if acquired as open space, would protect the most important natural resource areas in Harwich, Brewster, and Chatham.
- Cape Cod Atlas of Tidally Restricted Salt Marshes. 2001. Cape Cod Commission.

Who is collecting water quality data and where:

- The Brewster Pond Water Quality Stewards including 31 volunteers are testing 21 ponds for dissolved oxygen, temperature, and water clarity bi-weekly June-September and collect water samples from 15 ponds monthly and deliver to the North Atlantic Coastal Laboratory, Truro for analysis. Ponds sampled in the Herring River subwatershed are Sheep, Cahoon, Mill, Smalls, Greenland, Long, Black, and Seymour.
- Long Pond monitoring since 1996.
- Four sampling locations on Long Pond in the 1999 Cape Cod Commission study.
- Horsely & Witten collected data at six sampling sites: Wixon Dock town landing, the Route 28 bridge, where North Rd. comes closest to the river at the lower end, where Lothrop Avenue crosses the eastern branch of the river, where North Road crosses the river and just below the western reservoir.
- Harwich Shellfish and Marine Water Quality Committee; Herring River
- Division of Marine Fisheries, Harwich Natural Resources, and Harwich water quality volunteers: several stations between Nantucket Sound and the Herring Reservoir.
- Harwich Natural Resources Department proposed in 2001 to expand upon the current sampling locations and begin monitoring many of the 33 ponds in Harwich. Samples will be analyzed for the nitrogen series, orthophosphates, total phosphates and chlorophyll a.

Management actions taken:

- The coastal waters of Harwich were designated a No Discharge Area by the state. The discharge of all boat wastewater, even if it is treated, is prohibited.
- In 1999, Harwich Town Meeting and in 2000, the Brewster Town Meeting voted to prohibit launching of personal motorized craft from town owned freshwater pond landings.
- In August 2001, new zoning regulations were put in place for the Six Ponds DCPC. The new regulations had the effect of increasing the minimum lot size requirement from about 1 acre to about 2 1/2 acres in most of the area.
- Sheep Pond Woodlands Project will receive up to \$250,000 in federal Land and Water Conservation Fund assistance, administered by the National Park Service. Project involves the purchase of these woodlands by the Town of Brewster to add to its open space estate. Project must be completed by June 2002.
- Harwich Conservation Commission received a Year 2002 Self-Help Grant of \$208,000 to purchase the Slowatycki property on Lothrop Avenue. The 23 acre property abuts town conservation, has 1,600 feet on Coy's Brook tidal creek, and is ranked in the top 10 of town priority parcels.

- In 2001, a 19.2 acre parcel of land on the northeastern shore of Long Pond in Brewster was purchased by a developer for the construction of seven house lots. The Brewster Planning Board required that there be a minimum setback from Long Pond of 300 feet for sanitary systems and development. A natural buffer of 300 feet between the development and the pond will be maintained except a six-foot pathway is authorized for access to Long Pond by future property owners. The developer has contributed to the Town of Brewster the sum of \$30,000 for remediation of Long Pond conditions.
- Massachusetts Division of Fisheries and Wildlife stocks Sheep Pond with rainbow, brook, and brown trout.
- Harwich Conservation Trust developed a priority open space project with the help of The Compact of Cape Cod Conservation Trusts. The project identified the top 200 parcels for open space acquisition. Fifty percent of the 200 parcels are in the Herring River Subwatershed, and 20 percent are near or adjacent to freshwater ponds.

Subwatershed facts: (See Appendix for data sources)

- 21 E sites: 7. Located at Getty Station (FMR), Main St. Dennis; Mobil Station, Rte. 28; Dennisport Autolaundry, 13, Hall St.; 20 Elwood Rd., Harwich; Residence, Depot Street; Property, Oak St.; Rte. 28/Gray Neck (?), Main St. Harwich
- Solid waste sites: 2
- Zone IIs located in this watershed: 2
- Interim Wellhead Protection Areas (IWPAs): 2
- Percent of the undeveloped land that is protected (according to 1985/1990 data): 12.5%
- Acres of existing wetlands: 685
- Certified vernal pools: 1
- Named freshwater ponds: West Reservoir, East Reservoir, Sand, Flax, Island, Andrews, Littlefields, Robbins, Hinkley's, Walker's, Hawksnest, Aunt Edie's (*Harwich*), Sheep, Greenland (*Brewster*), Dark Bottom, Seymour, Black, Long, Smalls, Mill, Cahoon (*Harwich/Brewster*)
- Named rivers or creeks: Herring River (*Harwich*)
- 1998 Massachusetts 303(d) List of Impaired Waterbodies: A segment of the Herring River, from the outlet reservoir above Bells Neck Road to the mouth at Nantucket Sound – pathogens. Sheep Pond – organic enrichment/low dissolved oxygen.
- Shellfish growing areas: unknown
- Beach closures: The Wixon Dock on the Herring River, Belmont Beach, and the beach on Aunt Edie's Pond were closed for swimming during part of the summer in 2001 due to high levels of the bacteria enterococcus.
- This watershed contains Natural Heritage and Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife.

Priorities:

- Investigate cause of high levels of e. coli bacteria in runoff into Long Pond at Harwich Town Landing (1997 data). Potential cause is bath house that serves 1000-1500 people/day during the summer with a septic system three feet off the lake water table.
- Add Long Pond to the Massachusetts 303(d) List of Impaired Waterbodies.
- Develop and implement TMDL for Sheep Pond (from DEP Watershed Status Report and Actions Taken, 2002).
- Implement measures recommended in the Long Pond Management Plan (2001) to improve water quality.

- Secure funding for aluminate application and the review and development of bylaws and regulations to protect Long Pond. Joint effort by the Town of Brewster, Town of Harwich, Cape Cod Commission, and Long Pond Watershed Association.
- Address the root causes of phosphorus in Long Pond – land uses surrounding the pond – through a review of development practices near the shores of Long Pond and regulation and education of lakefront homeowners.
- Initiate a comprehensive monitoring program for the Herring River to determine the percentage of nitrogen being removed through denitrification of watershed nitrogen loads. (Recommended by the Cape Cod Commission, based on its Coastal Nitrogen Loading Project of 2000.)
- Town of Harwich should continue to purchase potentially developable land located within the existing wellhead protection areas and areas for use as future well sites (SWAP Report, 2001).
- Robbin Pond and Andrew's Pond need volunteers to participate in the Pond and Lakes Stewardship Project (PALS), measuring water quality and other characteristics of the ponds.
- Implement recommendations from the Draft Herring River Watershed Management Plan, 2002.
- Address storm drains at Route 28 and Lower County Rd. Implement BMPs at boat ramp and parking lot at Route 28. Examine pipes that go into swales that lead into Herring River. Install BMPs. (DMF Sanitary Surveys)
- Improve storm drains on MA Highways located on Route 28 where it crosses over the Herring River and along Route 6A where it crosses the river. (NRCS)
- Develop funding partnerships with the between the Town of Brewster and the Brewster Conservation Trust, state and federal agencies, and land donations by private landowners in order to achieve their goal of preserving half (2,900 acres) of remaining open space.
- Recommendations from the Diagnostic Study of Herring River, Harwich are:
 - o Reduce the amount of aquatic vegetation by manual clearing and in the long term by increasing the flow velocity just south of the Main Street bridge by building a flume.
 - o Control sedimentation by addressing the areas of erosion along the river identified in the study.
 - o Investigate stormwater discharges to the Herring River at four areas in the Town of Harwich, and to the headwater ponds (Long and Blacks Ponds) at two locations in Brewster.
- Implement those salt marsh restoration projects identified in the 2001 *Cape Cod Atlas of Tidally Restricted Salt Marshes* that have been evaluated and prioritized by the town. Sites are: Lower County Road restriction of the Herring River (Site HA-1), Route 28 restriction of the Herring River (HA-2), Salt Meadow Lane restriction of channel off the Herring River (HA-3), and Lothrop Road restriction of a tributary to the Herring River (HA-4).
- Acquire open space. Parcels considered a priority for acquisition for water supply protection and development: Harwich Tracts 8, 10, 11, 18, 19, 23, 30, 31, 34, 35, 36, 37, 39, and 41 were ranked as having medium or high water supply development potential in the Cape Cod Commission's *Priority Land Acquisition Assessment Project* (April 1999). These tracts are located throughout the Town of Harwich.

Recreation:

Camping areas: Girl Scout Camp on Long Pond

Golf courses: Cranberry Valley Golf Course

Pathways and trails:

- Cape Cod Rail Trail
- Punkhorn Parklands
- Coy's Brook Woodlands
- A. Janet DeFulvio Wildlife Sanctuary Boardwalk
- www.capecodcommission.org/pathways/trailguide.htm

Public access:

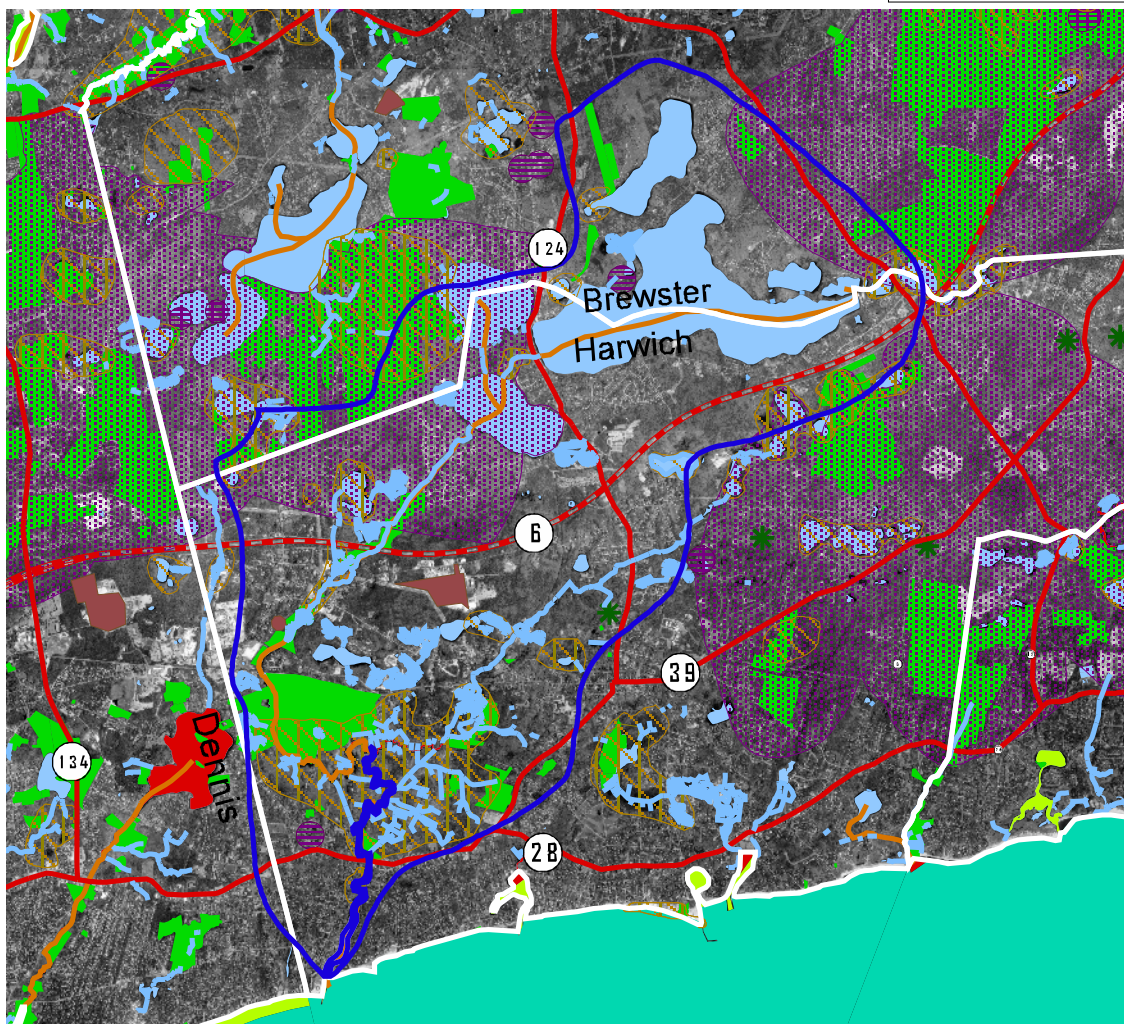
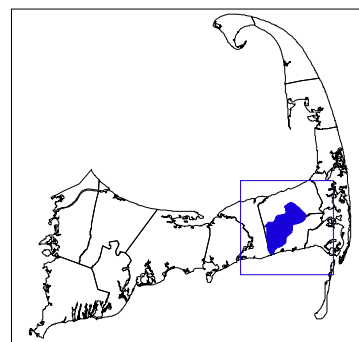
- www.state.ma.us/dfwele/pab/pabSEmap.htm

Public beaches and landings:

- Landing on Long Pond, Landing on Long Pond, Sheep Pond Landing
- Long Pond Beach, Sand Pond Beach, Fernandes Bog at Long Pond, Sheep Pond Beach

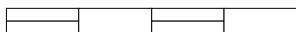
Herring River

Harwich and Brewster, MA



Watershed Resources

0 0.5 1 1.5 2 Miles



Natural Heritage and Endangered Species Program Data

- Certified Vernal Pool
- Priority Habitats of Rare Species
- Estimated Habitats of Rare Species

Groundwater Protection Areas

- Interim Wellhead Protection Area
- Zone II
- Solid Waste Facility

Watershed Boundary

Anadromous Fish Run

- Anadromous Fish Run

Shellfish Growing Areas

- APPROVED
- CONDITIONALLY APPROVED
- MANAGEMENT CLOSURE
- PROHIBITED
- RESTRICTED

Open Space

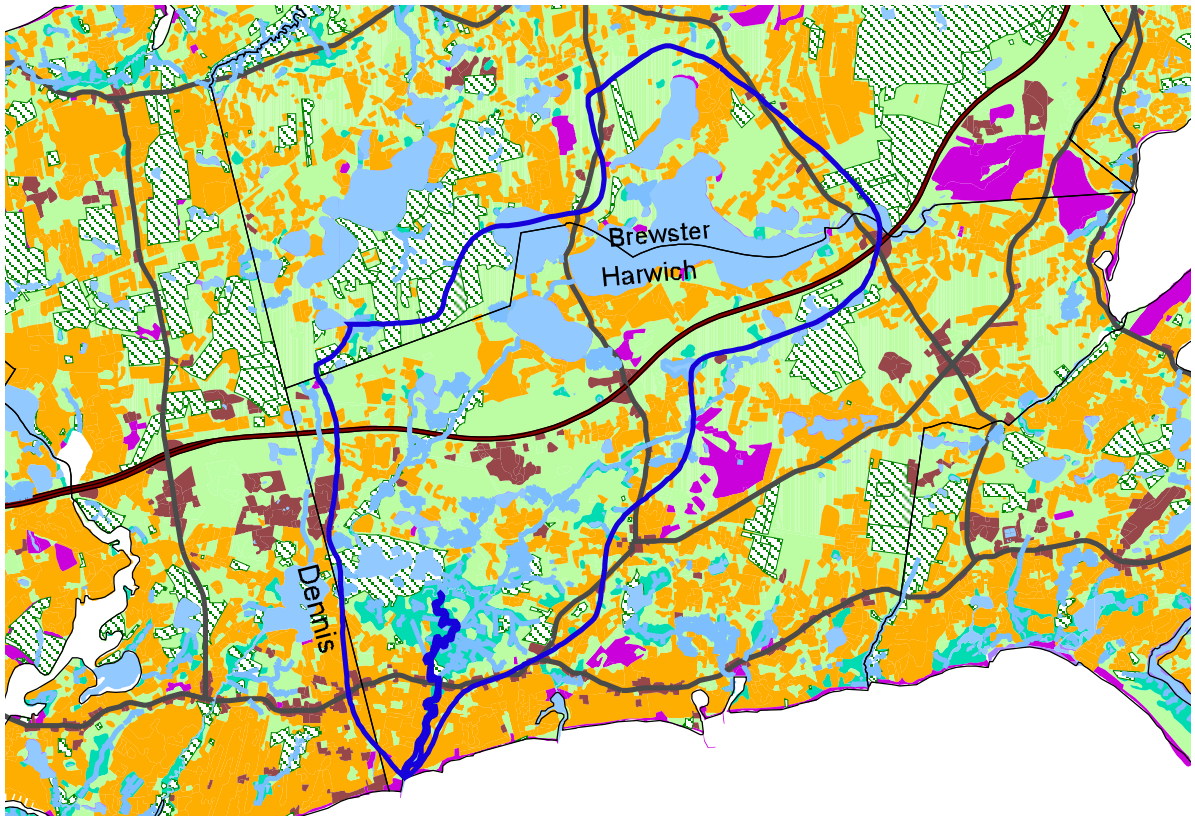
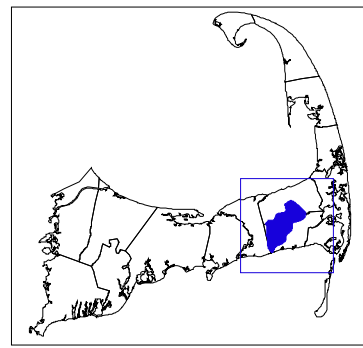
Streams

Ponds

Roads

Herring River

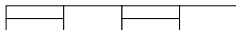
Harwich and Brewster, MA



Land Use



0 0.5 1 1.5 2 Miles



Land Use

